Taiwan Competitive Specification - Phase B

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ABSTRACT: This specification identifies the approved deviations from applicable Digital standards for manufacture of products in the Taiwan plant. These deviations are grouped according to component, product, and process.

APPLICABILITY: This document applies only to the Taiwan plant. All current Digital standards will be followed except as specifically noted in this document. This document is to be used in conjunction with the product matrix Engineering Specification relating to specific products.

STATUS: APPROVED 23-SEP-1991; use VTX SMC for current status.

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1 Introduction

In order to manufacture competitive products, a core team composed of members from Digital GIA manufacturing in the United States and the Far East developed, evaluated, and tested modifications to manufacturing practices required by current Digital standards and specifications.

1.1 Purpose

In an effort to manufacture competitive commodity products this specification identifies and describes the approved deviations from applicable Digital standards and specifications accepted for the manufacture of these products.

1.2 Scope

The approved deviations are grouped under three headings: component, product, and process. This specification identifies the deviations, provides a brief background for each deviation, and lists the current Digital documentation affected.

1.3 Definitions

No Risk Process:
All deviations will be tested in the product or confirmed by testing in similar products to ensure that there is no impact to quality, reliability or regulatory requirements.

Core team:
GIA Group Quality Manager, HKO Plant Manager, TAO Plant Manager, ZGO Plant Manager, GIA Group M.E. Manager, GIA Group CE/VQE Manager, VIPPS & GIA Group Manufacturing Manager

PNRF:
Part Number Request Form

SPOC:
Specifications on Computer

MRCI:
Machine Readable Component Information

1.4 Applicability

This specification applies only to those products identified within the Taiwan manufacturing plant and using a specific manufacturing process. The product has to pass the "No Risk" process. Products introduced into the same manufacturing plant after the release of this specification, and that will use the same manufacturing process may use the deviations identified in this specification provided they pass the "No Risk" process and receive the approval of the Core team, through a change to the product matrix Engineering Specification.

2 Component Deviations

2.1 Deviation: Remove the need of generating and maintaining purchase specifications for 90-class parts by using industry standard data.

To develop and load parametric information into the MRCI data base. This, tied-to-yet-to-be-developed general standards, will not require the generation of formal purchase specifications. This will require a deviation to DEC STD 055, *Requirements for Purchase Specifications* and DEC STD 156, *Introducing New Purchased Parts and Maintaining Purchased Parts Information: Standard Procedures.*

2.1.1 Background

The availability of the MRCI data base for component parametric information eliminates the need to generate Purchase Specifications for components in the 90-class hardware category. This category consists of industry-standard parts.

2.1.2 Standards and Other Documents Affected

Standards affected by component deviations are:

- DEC STD 055
- DEC STD 156

The part description and vendor part number on the QVL shall be sufficient to identify and define the part. When filling in PNRF, specification control should answer "no" against the question "Does a released purchase specification exist?"

Original Text

DEC STD 156-0

> Subhead 1.3.2.f.
> Ensure that for all new parts, a technically correct purchase specification is created, approved, and included in SPOC.
>
> Subhead 6.2.2.1.
> Purchase Specification

DEC STD 055

> Subhead 2.1.2
> (TYPE 4 is not in existence)

Proposed Deviation

DEC STD 156

> Subhead 1.3.2.f.
> Ensure that, except for those parts for which an existing industry standard or data may be acquired, a technically correct purchase specification is created, approved, and included in SPOC.
>
> Subhead 6.2.2.1.
> Purchase Specification (or Industry Standard/Data)

DEC STD 055

Subhead 2.1.2
(TYPE 4 General Specification Added)
TYPE 4:
Comprised of the existing Industry Standards for a specific commodity of items, such as ANSI B18.6.3, Slotted and Recessed Head Machine Screws and Machine Screw Nuts.
Purpose:

- Eliminates creation and maintenance of Digital purchase specifications by using industry standards.
- Facilitates simplification of parts selection by specifying an item commonly used in the industry.

2.2 Deviation: Remove the need of generating and maintaining purchase specifications by using industrial standards for 99-Class parts.

To develop and load parametric information in the MRCI data base. This information tied to the packaging manual will not require the generation of formal purchase specifications.

2.2.1 Background

The availability of the MRCI data base for component parametric information eliminates the need to generate Purchase Specifications for components in the 99-class packaging category. This category consists of industry-standard parts.

2.2.2 Standards and Other Documents Affected

- DEC STD 055
- DEC STD 156

Original Text

DEC STD 156

Subhead 1.3.2.f.
Ensure that for all new parts, a technically correct purchase specification is created, approved, and included in SPOC.

Subhead 6.2.2.1.
Purchase Specification

DEC STD 055-0

Subhead 2.1.2
(TYPE 4 is not in existence)

Proposed Deviation

DEC STD 156-0

Subhead 1.3.2.f.
Ensure that, except for those parts for which an existing industry standard or data may be acquired, a technically correct purchase specification is created, approved, and included in SPOC.

Subhead 6.2.2.1.
Purchase Specification (or Industry Standard/Data)

DEC STD 055-0

Subhead 2.1.2
(TYPE 4 General Specification Added)

TYPE 4:
Comprised of the existing industry standards for a specific commodity of items, such as Fiber Box Association manual for corrugated boxes.
Purpose:

- Eliminates creation and maintenance of Digital Purchase Specifications by using Industry Standards.
- Facilitates simplification of parts selection by specifying an item commonly used in the industry.

2.3 Deviation: Perform supplier assisted qualification.

Use verifiable supplier data for part or all of the qualification information.

2.3.1 Background

Verifiable data from a reliable supplier on an ongoing continuous quality improvement program (such as SSMP) shall be considered suitable evidence for supplier qualification to some or all at the Digital requirements. The signatory Digital Component Engineer is responsible for review and approval of all such data.

2.3.2 Standards and Other Documents Affected

Not applicable

2.4 Deviation: Develop family type ship-to-stock (STS)

Current practice, is to add parts on STS one by one. Deviation is to add other parts in the same "family" (that is from the same manufacturing process) when a representative supplier part from the same process qualifies for the program.

2.4.1 Background

When a supplier has given sufficient evidence of process control to qualify a part for STS, other similar parts made with the same manufacturing process may also be considered qualified, without repeating the full qualification procedure.

2.4.2 Standards and Other Documents Affected

Document affected by this deviation:

EL-MF348-0 Ship tp Stock Supplier Qualification Program - Basic Agreement and Release Procedure

Original Text

Subhead: Product Qualification Requirements, 3

...each product must successfully complete a product qualification process consisting of the following:

— First Article Inspection or Electronic Component Qualification

— Characteristic Accountability Sheet Exhibit (CASE)

— Lot-by-Lot Inspection of at least three consecutive lots

Subhead: Characteristic Accountability Sheet Report, 3.3

...The case shall include the following information:

1. A list of characteristics on the drawing, including applicable specification requirements
2. Process or machine producing the characteristic
3. Points of control for each characteristic
4. Method of measurement
5. Quality Assurance Method/Level

Proposed Deviation

Subhead: Product Qualification Requirements, 3

..each product must successfully complete a product qualification process consisting of the following:

— First Article Inspection on a representative sample of the product family or Electronic Component Qualification

— One Characteristic Accountability Sheet Exhibit (CASE) per family of product

— Sufficient inspection history of a representative sample of the family of product

Subhead: Characteristic Accountability Sheet Report, 3.3

The case shall include the following information:

1. A list of characteristics on the drawing, including applicable specification requirements.
2. Process or machine producing the characteristic
3. Points of control for each characteristic

4. Method of measurement
5. Quality Assurance Method/Level
6. Part number or Product family by Functional Class Descriptor (FCD) or other description

2.5 Deviation: No specification correlation for industry standard parts when implementing the Supplier Systems Management Program (SSMP) vendor quality program.

The SSMP program requires that all Specifications be correlated. In line with the opportunity to not require Digital Purchase Specifications for Industry Standard Parts, where such parts are purchased from an SSMP supplier no new Digital Specification is needed, and any existing Digital Specification may be waived from the correlation requirement under this opportunity. (These Specifications will be inactivated when there is no impact aside from products covered by the Competitive Specifications.)

2.5.1 Background

By definition, no Digital specification written to document an industry standard part will include any requirement unique to Digital or in any way conflict with the industry standard requirements adhered to by the supplier. Therefore no burden of correction may be placed on the supplier, and no error in any existing Digital document should be allowed to impede the SSMP program.

2.5.2 Standards and Other Documents Affected

Documents Affected by this de viation are:

- EL-MF521-03 Supplier Quality Assurance Specification (SQA)
- EL-MF521-04 Supplier Quality Agreement

Original Text

EL-MF521-03

> Subhead 12.5
> Prior to completion of product qualification for this program, specification correlation must be achieved.....

EL-MF521-04

> Subhead III. ATTAINING SSMP QUALIFICATION
>
> Date Complete
>
> ..... _____
> ..... _____
> Purchase specification correlation complete _____
> ..... _____

Proposed Deviation

EL-MF521-03

Subhead 12.5
Except for those parts for which an applicable industry standard exists, specification correlation must be achieved prior to completion of product qualification.....

EL-MF521-04

Subhead III. ATTAINING SSMP QUALIFICATION

	Date Complete
.....	_____
.....	_____
Purchase specification correlation complete (not applicable for industry standard parts)	_____
.....	_____

2.6 Deviation: Develop/Implement Product Preferred Parts List

2.6.1 Background

Knowledge of preferred parts and recommended technologies can be critical to competitive product development. This item involves development and implementation of a Component Information System that can meet these needs.

2.6.2 Standards and Other Documents Affected

Not applicable

2.7 Deviation: Modernize The Component Systems (EWOC,TEAMDATA,APNRF,MRCI)

2.7.1 Background

Access to corporate-based component information systems from the TAO plant has been unacceptable. This is due to network bandwidth, traffic, and U.S. systems being closed for updates and backups.

New approaches have been taken to improve accessibility to component information and for update to central data bases. These new approaches use 4GL and AI tools along with load and inquiry programs that will operate in a remote location (TAO). Part of the central Rdb data bases will be copied to TAO for inquiry and other access.

2.7.2 Standards and Other Documents Affected

Not applicable

3 Product Deviations

3.1 Deviation: The Taiwan Manufacturing plant can apply an appropriate product qualification for a new product to shorten the time to market

The manufacturing plant does not need to follow the sequence of qualification activities along with phase review process and can eliminate certain related test steps or combine similar testing for product/process qualification.

3.1.1 Background

The intent of the qualification activities identified in the phase review process can be achieved without adhering to the specific sequence in which the activities are listed.

3.1.2 Standards and Other Documents Affected

Other Digital documents affected by this deviation:

- EL-EN522-00-0 Digital Qualification Process Manual

Original Text

Subhead: 1.8 Qualification Process Flow Diagram

> ...The diagram captures most of the major milestones, along with their relationships to each other and the phase review process as described in the rest of this document. The intent of the diagram is to provide users with the sequence of events and the relative timing of the various qualification activities with each other and the phase review policy.

Proposed Deviation

> ...and the phase review policy. If the following conditions are satisfied, the manufacturing plant does not need to follow the sequence of qualification activities along with phase review process and can eliminate certain related test steps From DVT/RQT/PVT sequence or combine similar testing for product/process qualification:
>
> 1. RQT can be skipped if product reliability test is well designed in DVT and fully demonstrated by DVT which agreed upon by review team and the product reliability can be recognized to meet the engineering specification requirement.
> 2. RQT can be skipped if the prerequisites of PVT (exclude RQT test review) specified in EL-EN522-00 are completely reviewed and accepted accordingly by review team after DVT completed or proven the acceptable product quality/reliability by prototypes build at the formal production line.
>
>   For a product qualification process, DVT and PVT are critical and essential for demonstrating a product design and process maturity prior to full revenue production. Therefore both of the tests can not be eliminated from the product qualification process as EL-EN522-00 specified. In the meantime, the purposes and the test steps to be

performed in qualification process for a new product should be clearly defined and well documented prior to the test.

4 Process Deviations

4.1 Deviation: Using CEM-3 instead of FR-4 for double side PWB base material

Waiver to DEC STD176-6 *Single-Sided/Double-sided Nonplated Through (SS/DS)Printed-Wiring Board Acceptance Criteria* until formal approval.

4.1.1 Background

CEM III PWB base material has been tested as a reliable alternative to FR-4 PWB base material for double-sided applications. Base material reductions in costs will be realized when CEM III is used in place of FR-4

4.1.2 Standards and Other Documents Affected

DEC STD 176-0 Printed-Wiring Board Acceptance Criteria

Original Text

DEC STD 176-1 Printed-Wiring Board Repair Criteria

DEC STD 176-2 Printed-Wiring Board Product Safety Criteria

DEC STD 176-3 Printed-Wiring Board Acceptence Criteria for SMOBC(Soldermask Over Bare Copper)Product

DEC STD 176-4 Surface Mount Printed-Wiring Board Acceptance Criteria

Proposed Deviation

DEC STD 176-6 is valid for Competitive Specifications

4.2 Deviation: Employ no-clean flux in wave soldering process

Remove module cleaning after wave soldering

4.2.1 Background

The implementation of a no-clean flux during wave solder will eliminate the need for module cleaning after the through-hole (PTH) assembly process. Savings in water and detergent costs as well as the elimination of wastewater discharge will also be realized.

4.2.2 Standards and Other Documents Affected

The standard affected by this deviation is:

- DEC STD-116-0 *Workmanship Standards Manual - Intriduction*

Original Text

Subhead: Contamination
4.1 Contamination

1. Contamination by any foreign material that may affect surface resistivity of the printed circuit assembly is not acceptable.
2. Foreign material shall be removed by thorough cleaning. Particular care shall be taken to eliminate the following:
   - — Metal chips
   - — Filings
   - — Clippings
   - — Salt (food residue)
   - — Wire strands
   - — Flux concentrations
   - — Rosin flakes
   - — Loose terminal
   - — Solder balls
   - — Solder splashes

Subhead: Acceptable (Minimum)
4.3 Acceptable (Minimum)

1. Wax from capacitors on the module, not in the area of the contact finger or connectors.
2. Small quantities of thermal compound are acceptable on a module provided that it is no more than 1/16 of an inch (0.063 inch or 1.59 mm) from the component (containing compound) and does not contact another circuit.

Proposed Deviation

Subhead: Contamination
4.1 Contamination

1. Contamination by any foreign material that may affect surface resistivity of the printed circuit assembly is not acceptable.
2. Module cleaning is optional after wave soldering, provided that module is free from the following material through proper process control.
   - — Metal chips
   - — Filings
   - — Clippings
   - — Salt (food residue)
   - — Wire strands
   - — Flux concentrations (except flux from no-clean flux)

— Rosin flakes
— Loose terminal
— Solder balls
— Solder splashes

Subhead: Acceptable (Minimum)
4.3 Acceptable (Minimum)

1. Wax from capacitors on the module, not in the area of the contact finger or connectors.
2. Small quantities of thermal compound are acceptable on a module provided that it is no more than 1/16 of an inch (0.063 inch or 1.59 mm) from the component (containing compound) and does not contact another circuit.
3. Flux residue from qualified no-clean flux are acceptable on a module provided that it is not in the area of the contact fingers or connectors.

4.3 Deviation:ALLOW 3/32-inch Lead Protrusion.

Allow maximum lead protrusion to 3/32-inch

4.3.1 Background

The increase of lead length protrusion for through-hole components on side two from a maximum of 1/16-inch to a "not-to-exceed" 3/32-inch will greatly reduce labor to trim excess lead lengths per existing Digital specifications, thus reducing associated labor costs.

4.3.2 Standards and Other Documents Affected

- DEC STD 116-1 *Workmanship Standards Manual - Printed-Circuit Boards*, Pages 1 through 28

Original Text

Component/Wire Lead Protrusion (Side Two) (Clinched and Unclinched)

15.1 General

Component leads must be long enough to extend through the printed circuit board. There must be evidence of the component lead on the non-component side of the printed circuit board. The protrusion of the lead shall be a maximum of 1/16 of an inch on side 2 of the standard plug-in PCBs (.5 of an inch backplane spacing). For non standard plug-in PCB lead length should be as stated in applicable engineering drawings.

Proposed Deviation

Component/Wire Lead Protrusion (Side Two) (Clinched and Unclinched)

15.1 General

Component leads must be long enough to extend through the printed circuit board. There must be evidence of the component lead on the non-component side of the printed circuit board. The protrusion of the lead shall be a maximum of 1/16 of an inch on side 2 of the standard plug-in PCBs (.5 of an inch backplane spacing), but maximum of 3/32 of an inch (0.093 inch or 2.38 mm) lead protrusion is still acceptable provided that the lead diameter is greater than 1/35 of an inch or the lead center distance is greater than 3/16 of an inch from the nearest adjacent lead. For non-standard plug-in PCB lead length should be as stated in applicable engineering drawings.

Board warpage should still follow DEC STD 116-0 page 1 through 22 Section 11.3

Original Text

Subhead: Unclinched Leads

15.2.1 Acceptable (Preferred)

Lead protrusion on side 2 of a module is visible in the solder fillet as a minimum and 1/16 of an inch (0.063 inch or 1.59 mm) maximum.

15.2.2 Acceptable (Minimum)

1. Lead outline is visible
2. Maximum of 1/16 of an inch (0.063 inch or 1.59 mm) lead protrusion

15.2.3 Unacceptable

1. Minor defect No evidence of lead outline visible
2. Major defect Lead protrusion greater than 1/16 of an inch (0.063 inch or 1.59 mm)

Proposed Deviation

Subhead: Unclinched Leads

15.2.1 Acceptable (Preferred)

Lead protrusion on side 2 of a module is visible in the solder fillet as a minimum and 1/16 of an inch (0.062 inch or 1.58 mm) maximum.

15.2.2 Acceptable (Minimum)

1. Lead outline is visible

2. Maximum of 3/32 of an inch (0.093 inch or 2.38 mm) lead protrusion is acceptable provided the lead meets one of the following conditions:
   a. The lead diameter is equal to or greater than 1/35 of an inch (0.73 mm)
   b. The lead center distance is greater than 3/16 of an inch from the nearest adjacent lead

15.2.3 Unacceptable

1. Minor defect- No evidence of lead outline visible
2. Major defects- Lead protrusion greater than 3/32 of an inch (0.093 inch or 2.38 mm)
3. Lead protrusion greater than 1/16 of an inch if the lead diameter is smaller than 1/35 (0.73 mm) of an inch and the lead center distance from the nearest adjacent lead is smaller than 3/16 of an inch.

4.4 Deviation: Use All Copper Board Instead of SMOBC

Use all copper board in addition to the PCBs defined in current DEC STD 176

4.4.1 Background

The all copper PWB process has been evaluated and tested as an acceptable replacement for SMOBC or tin/lead PWB technology for Taiwan Competitive Products. Savings in PWB material costs will be realized with the implementation of all copper PWB.

4.4.2 Standards and Other Documents Affected

Standards affected by all copper deviation are:

- DEC STD 176-0
- DEC STD 116-0

Original Text

DEC STD 176-0

Not Listed(NIL)

DEC STD 116-1

3.4 Acceptable (preferred)

1. No damage or scratches on the contact fingers
2. No pits or voids in the contact finger

Proposed Deviation

EL-00176

All copper board can be applied to any PWBs if it meets the requirement of DEC STD 176-5.

DEC STD-116

3.4 Acceptable (Preferred)

1. No damage or scratches on the contact fingers
2. No pits or voids in the contact finger
3. Exposed copper on all copper board after soldering process is acceptable

APPENDIX A REFERENCED DOCUMENTS

A.1 EL-Class Digital Documents

EL-Class Number	Document Title
EL-00055-00	*DEC STD 055-0 Requirements for Purchase Specifications*
EL-00116-00	*DEC STD 116-0 Workmanship Standards Manual - Introduction*
EL-00116-01	*DEC STD 116-1 Workmanship Standards Manual - Printed-Circuit Boards*
EL-00156-00	*DEC STD 156-0 Introducing New Purchased Parts and Maintaining Purchased Parts Information: Standard Procedures*
EL-00176-00	*DEC STD 176-0 Printed-Wiring Board Acceptance Criteria*
EL-00176-01	*DEC STD 176-1 Printed-Wiring Board Repair Criteria*
EL-00176-02	*DEC STD 176-2 Printed-Wiring Board Product Safety Criteria*
EL-00176-03	*DEC STD 176-3 Printed-Wiring Board Acceptance Criteria for SMOBC (Soldermask Over Bare Copper) Product*
EL-00176-04	*DEC STD 176-4 Surface Mount Printed-Wiring Board Acceptance Criteria*
EL-00176-06	*DEC STD 176-6 Single-Sided/Double-Sided Nonplated Through (SS/DS) Printed-Wiring Board Acceptance Criteria*
EL-EN522-00	*Digital Qualification Process Manual*
EL-MF348-00	*Ship-to-stock Supplier Qualification Program Basic Agreement and Release Procedure*
EL-MF521-03	*Supplier Quality Assurance (SQA) Specification*
EL-MF521-04	*Supplier Quality Agreement*

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